

FIG. 1

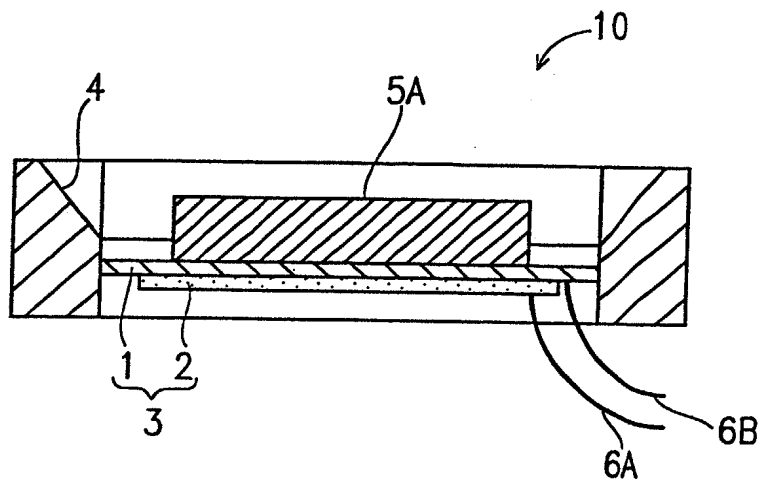


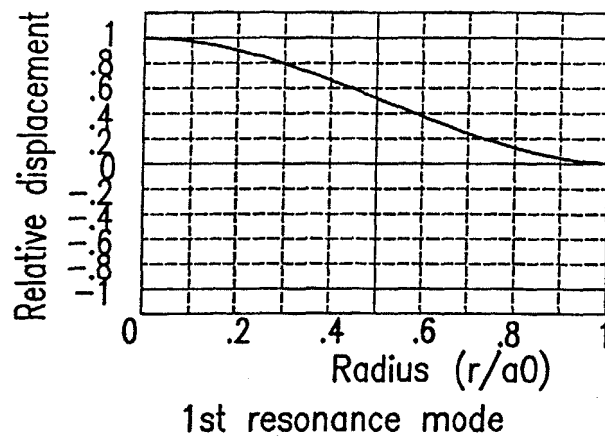
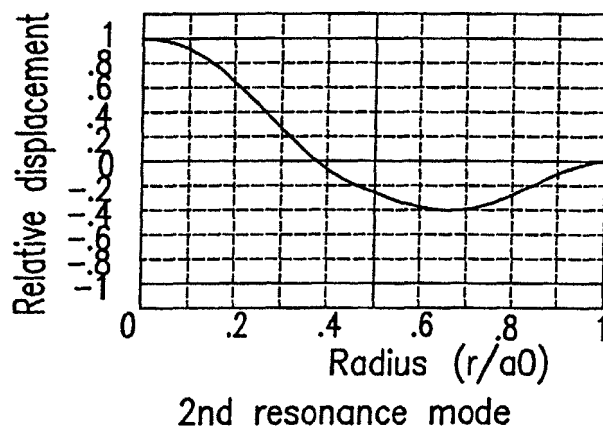
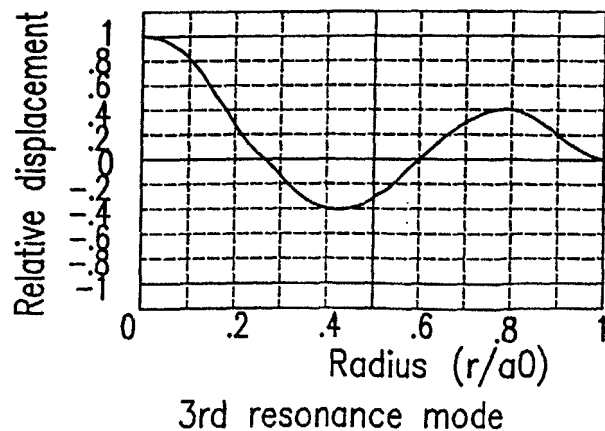
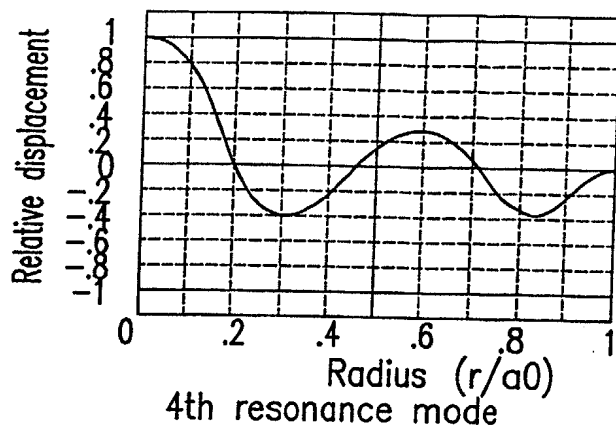
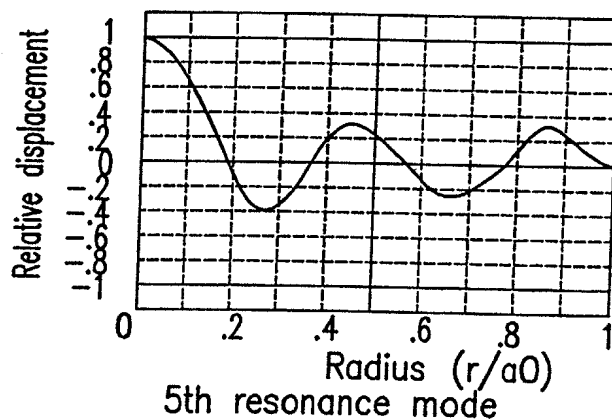
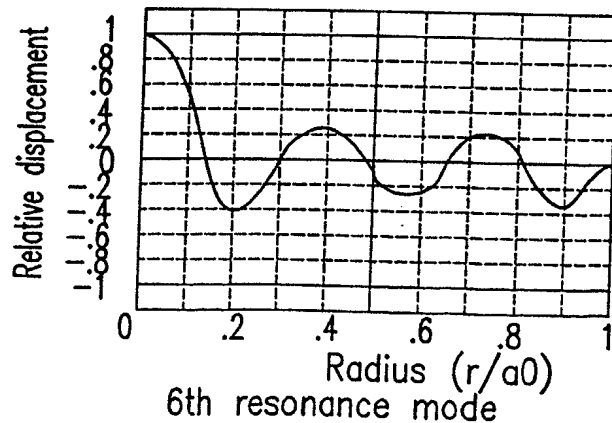
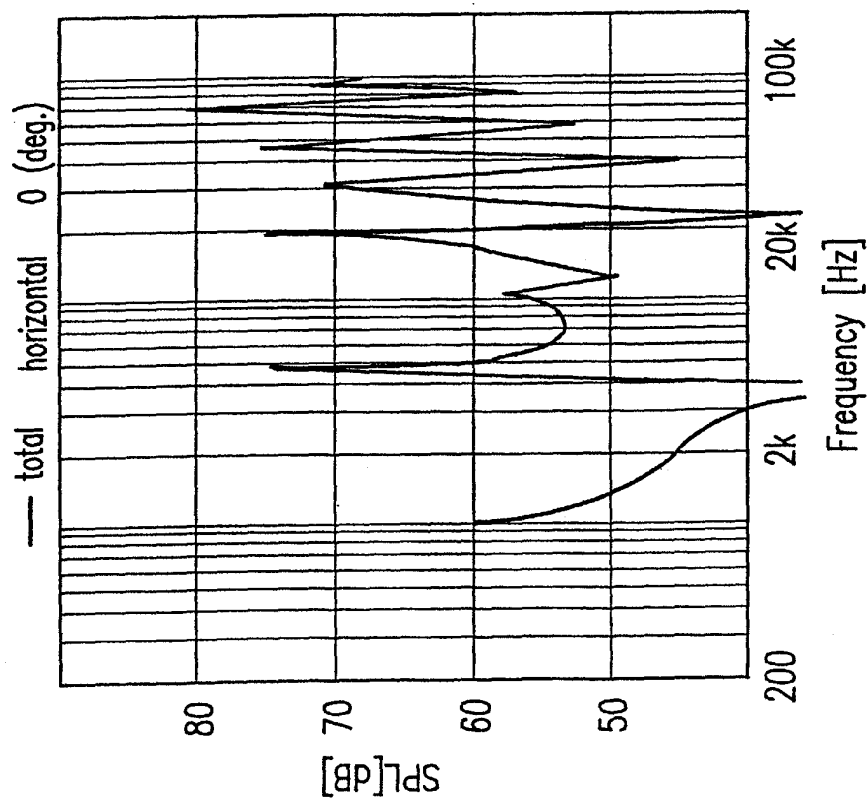
FIG. 2A*FIG. 2B**FIG. 2C*

FIG. 2D**FIG. 2E****FIG. 2F**

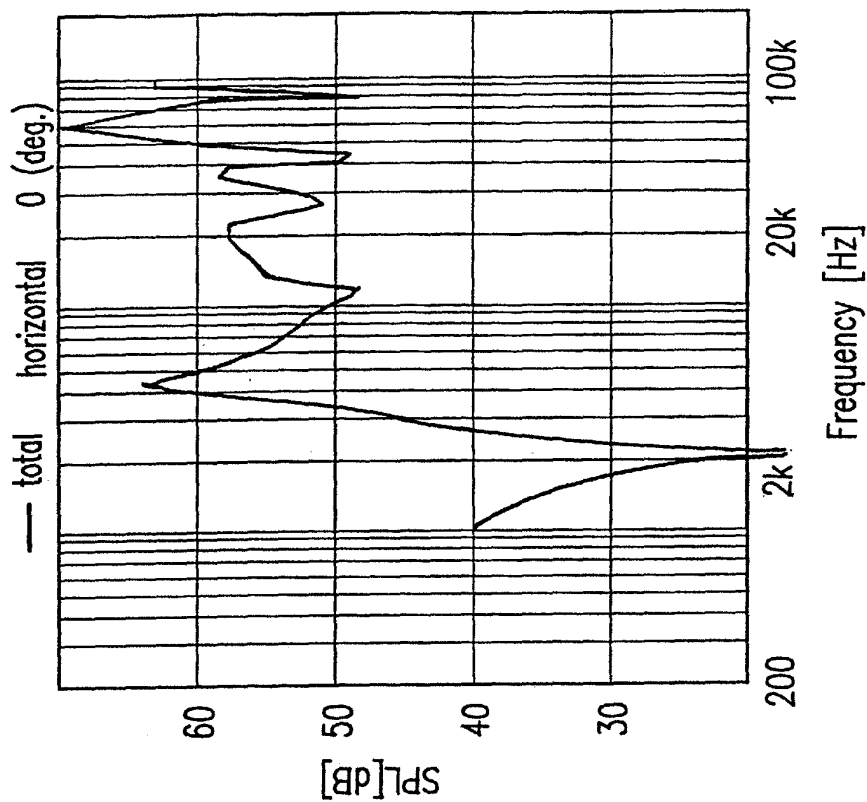
Vibration modes of piezoelectric vibrator

FIG. 3A



Without visco-elastic member

FIG. 3B



v/d ratio: 3%

FIG.3C

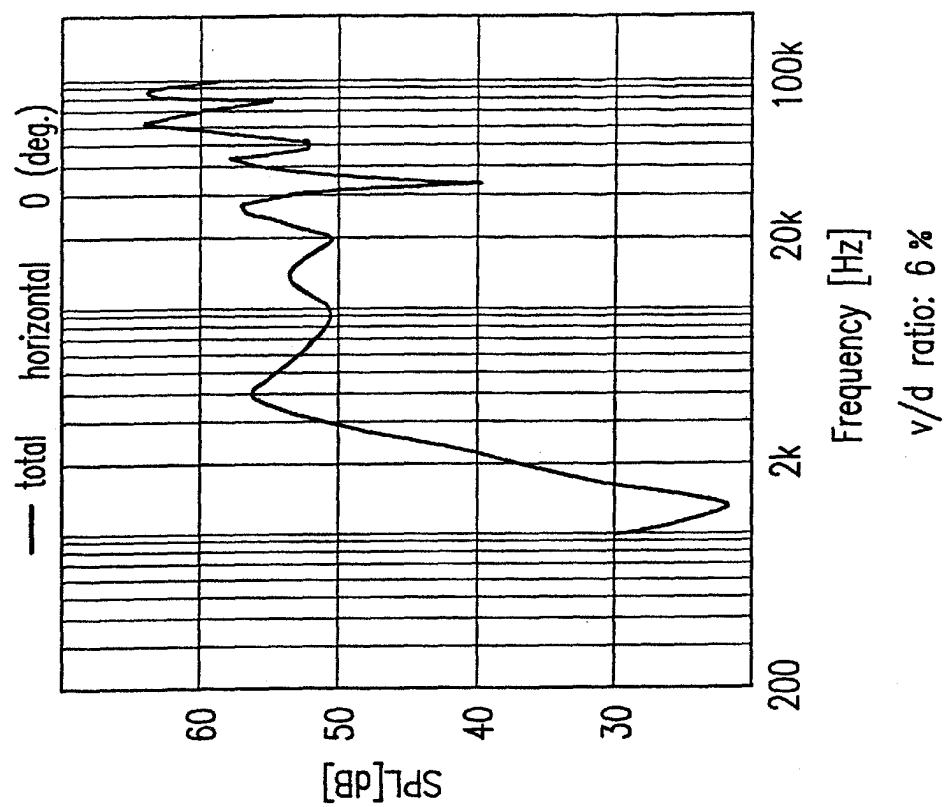


FIG. 4A

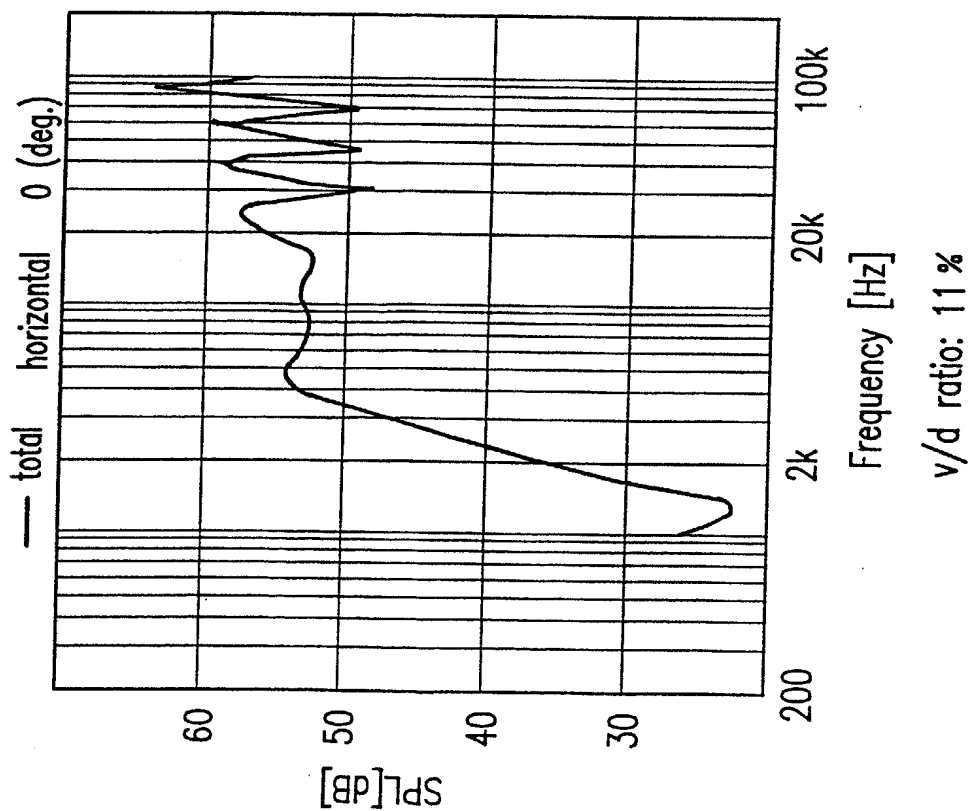


FIG. 4B

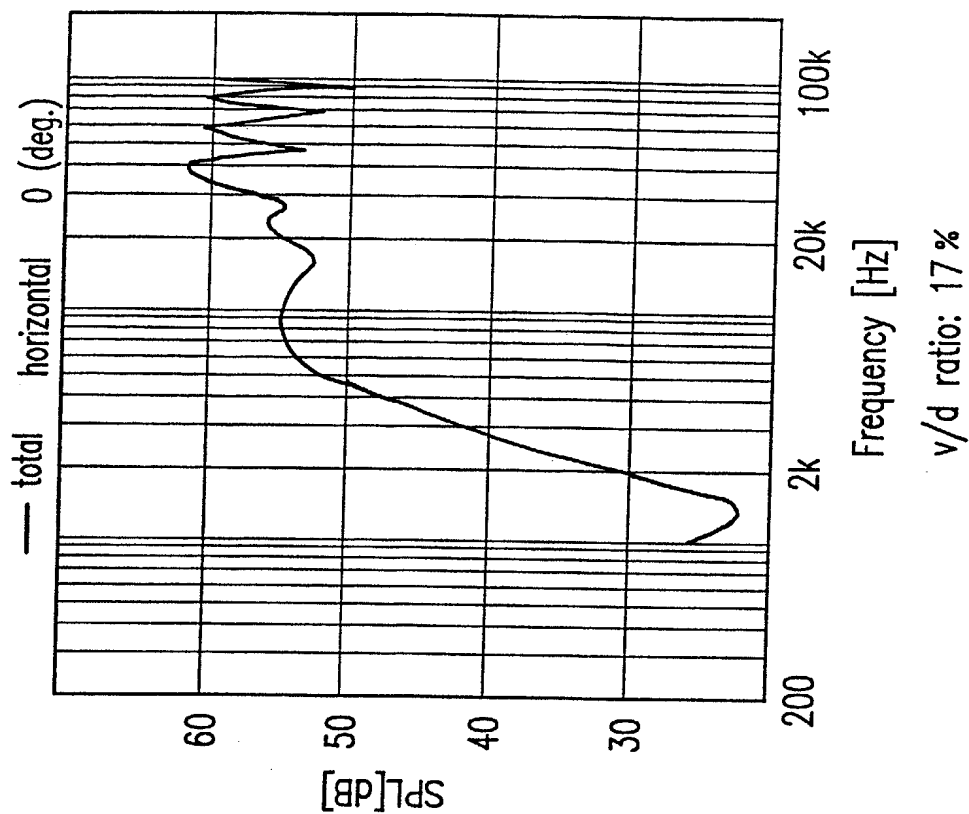


FIG.5A

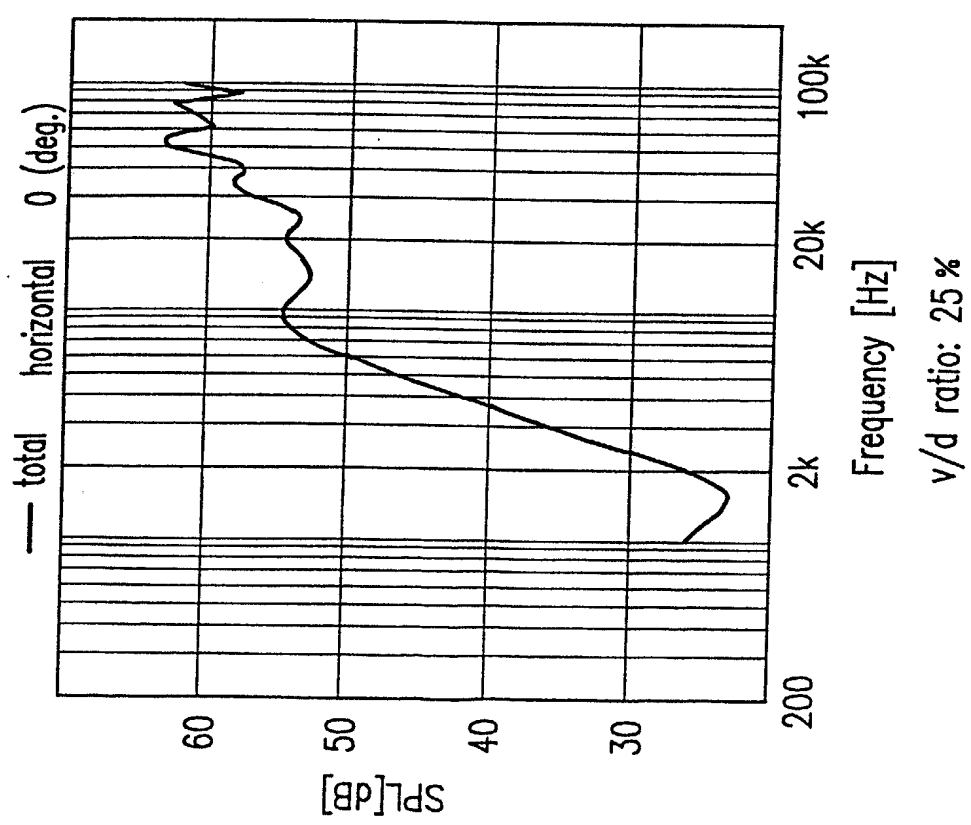


FIG.5B

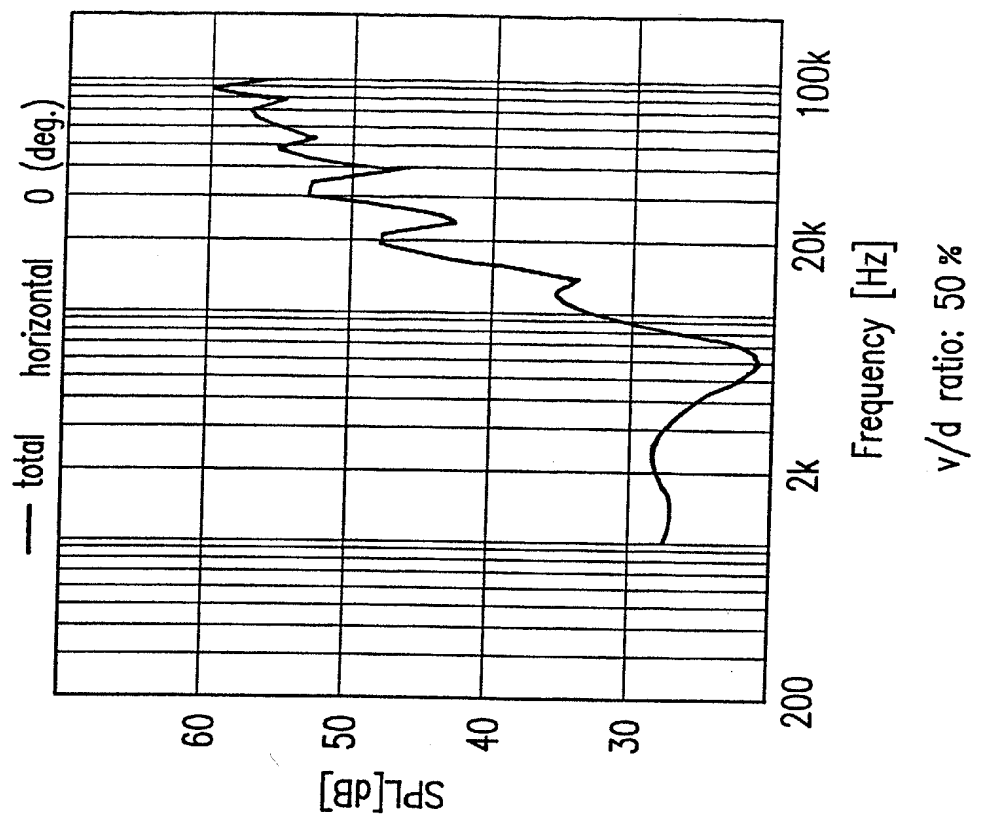


FIG.5C

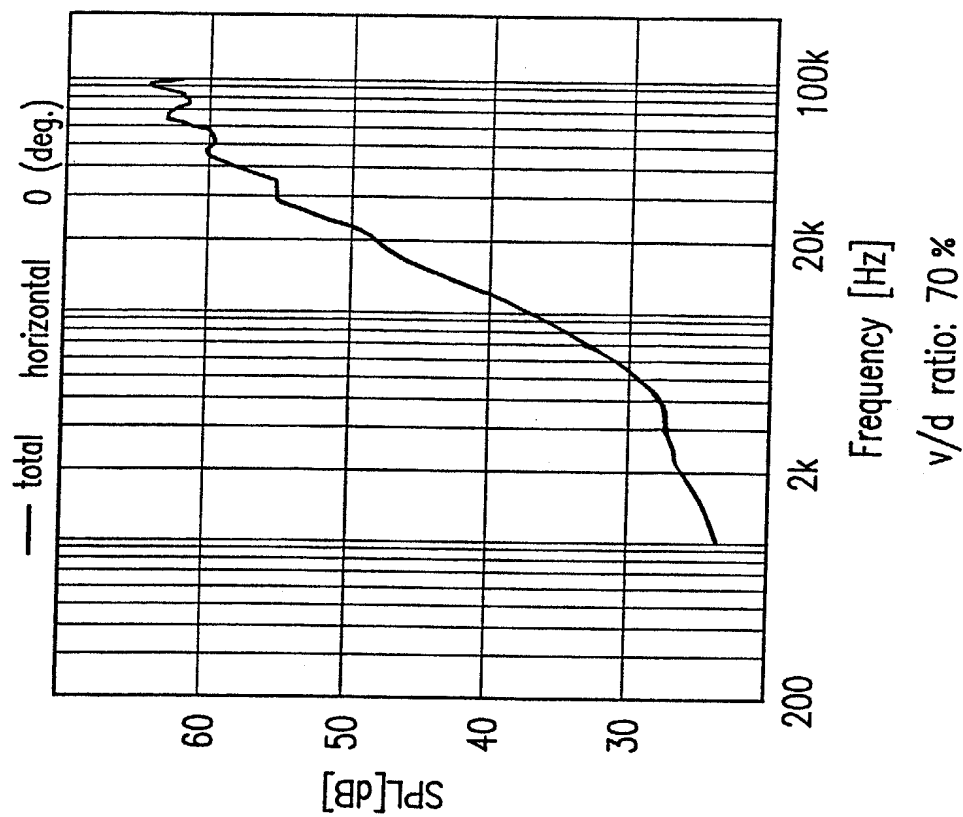


FIG. 6A

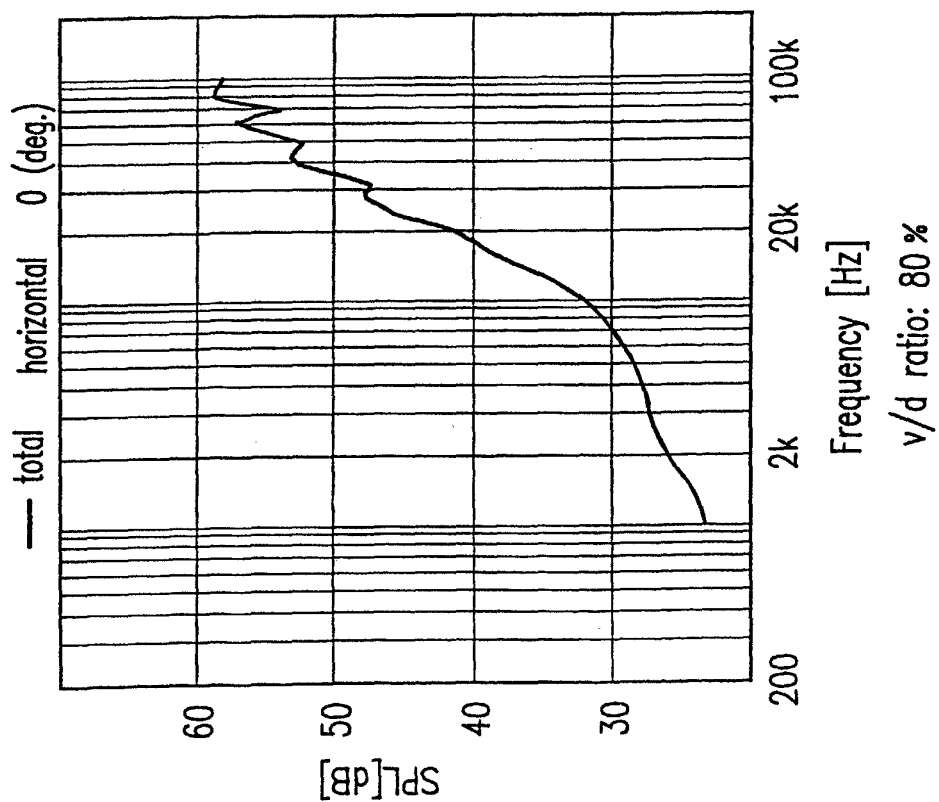


FIG. 6B

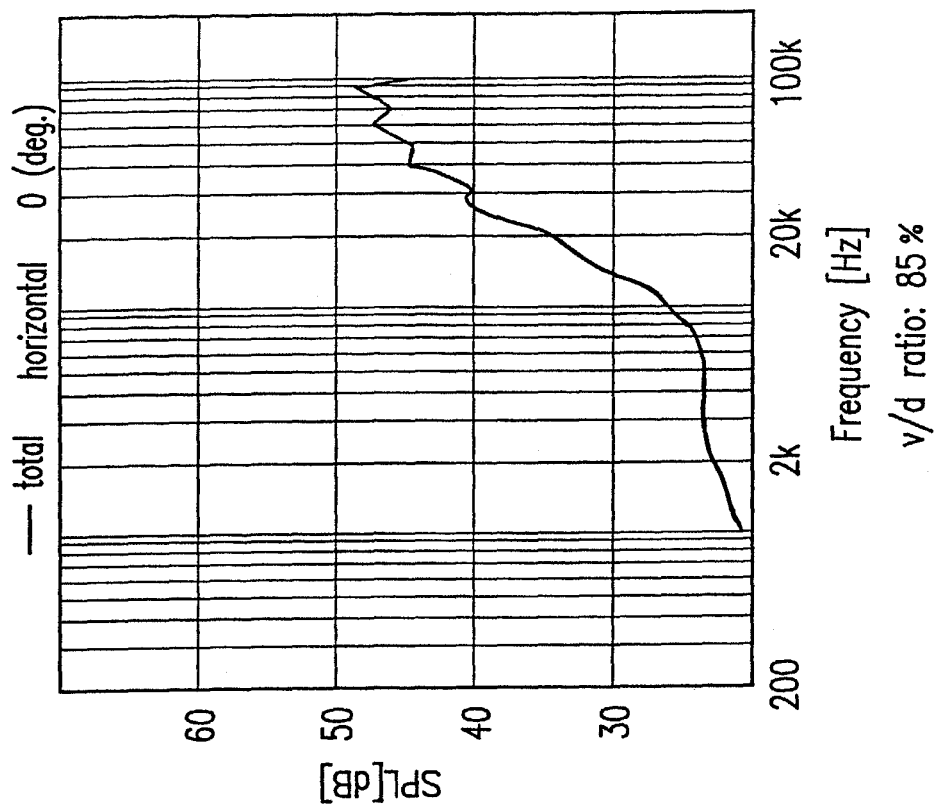


FIG. 6C

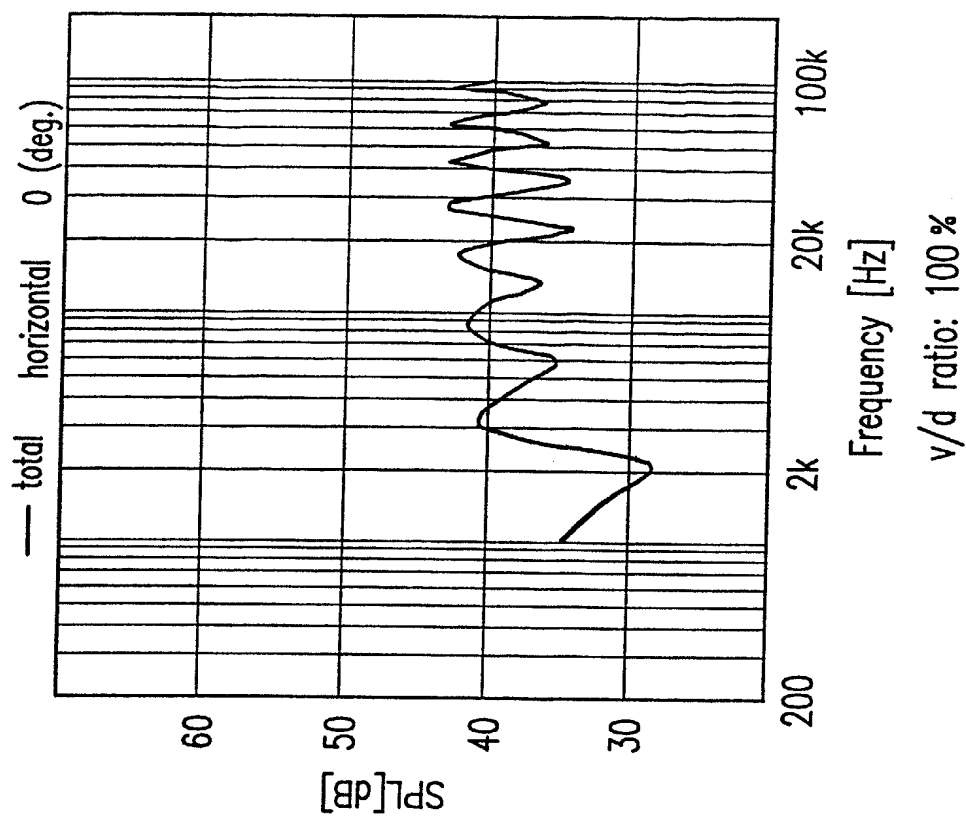
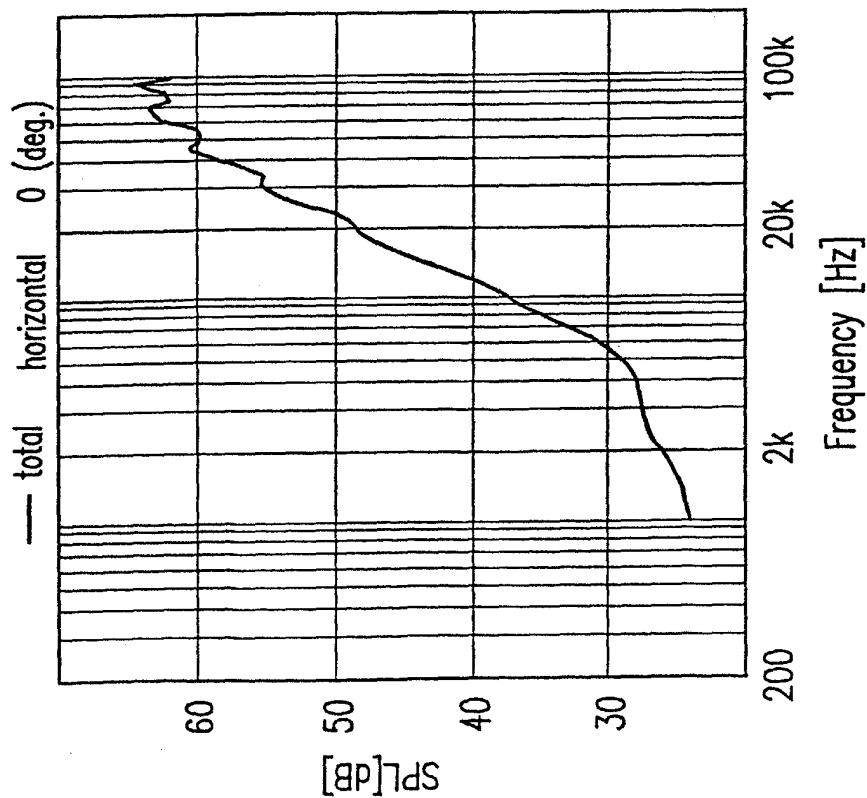
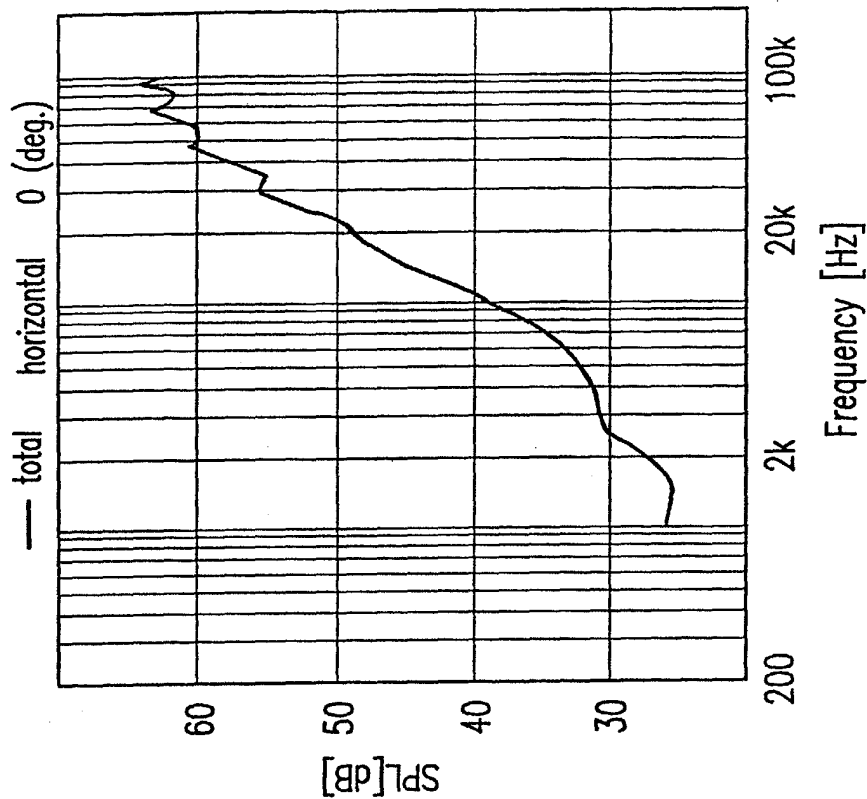


FIG. 7A



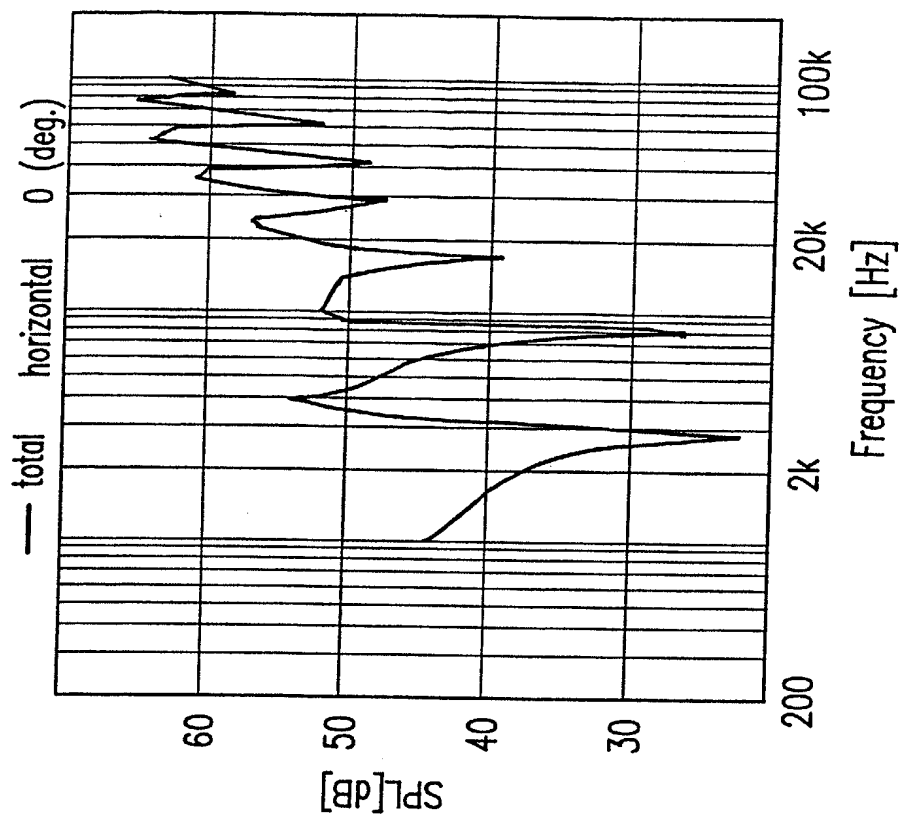
v/d ratio: 70 %
Visco-elastic member
has thickness of 5 mm

FIG. 7B



v/d ratio: 70 %
Visco-elastic member
has thickness of 3 mm

FIG. 7C



v/d ratio: 70 %
Visco-elastic member
has thickness of 1 mm

FIG. 8

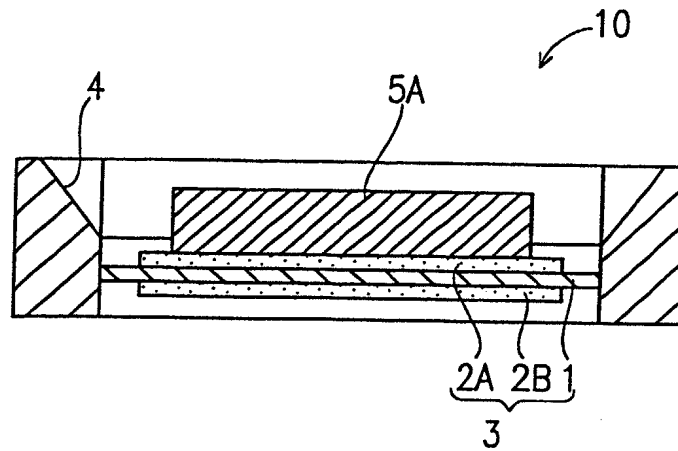


FIG. 9

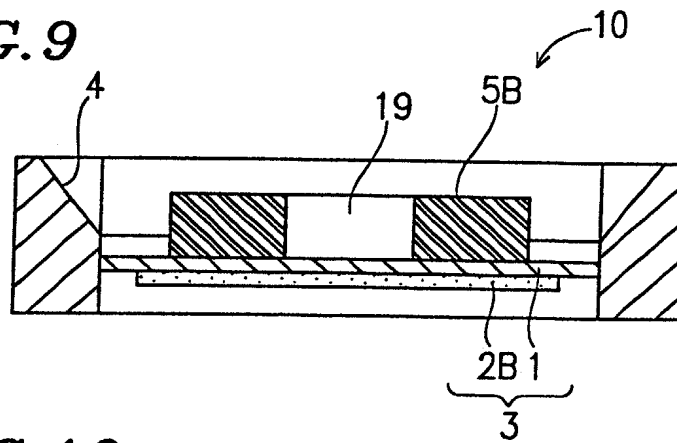


FIG. 10

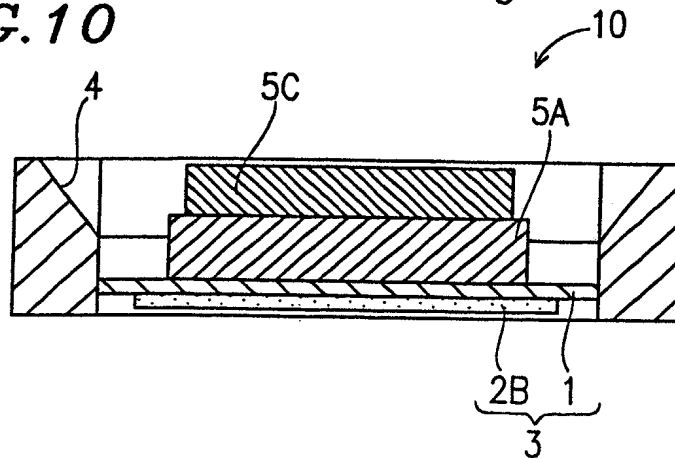


FIG. 11

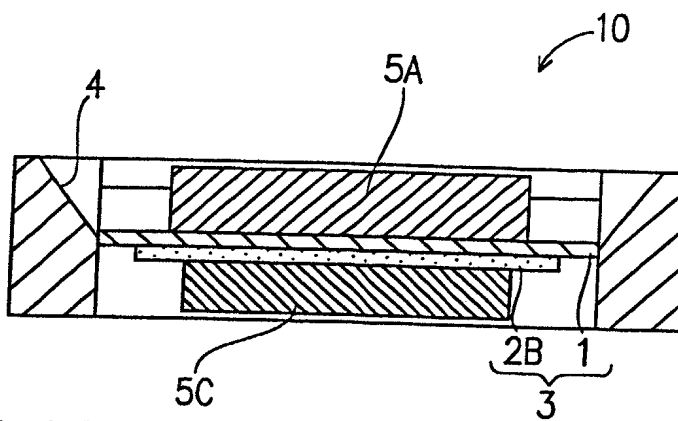


FIG. 12

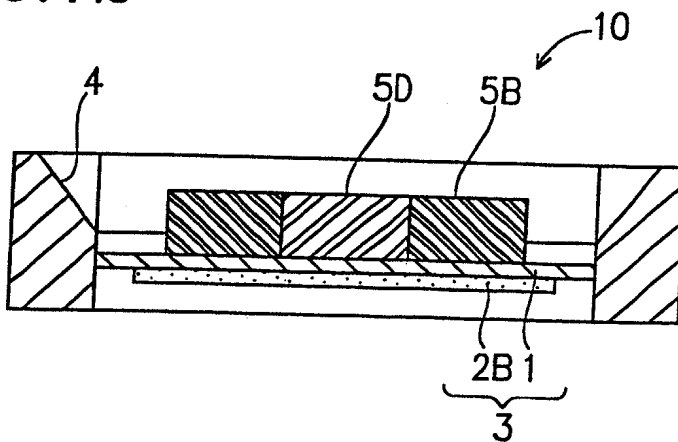


FIG. 13

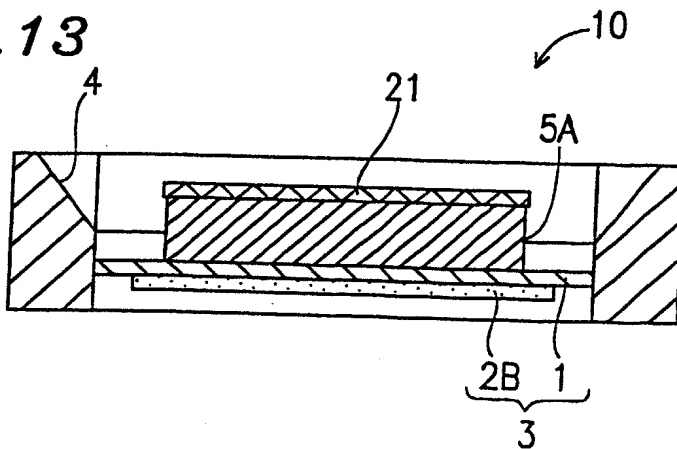


FIG. 14A

P21560

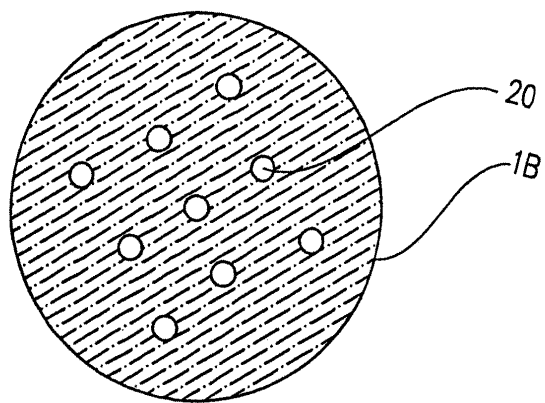


FIG. 14B

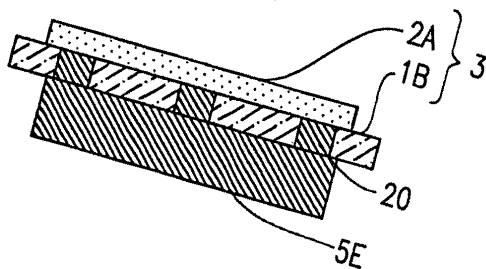


FIG. 15

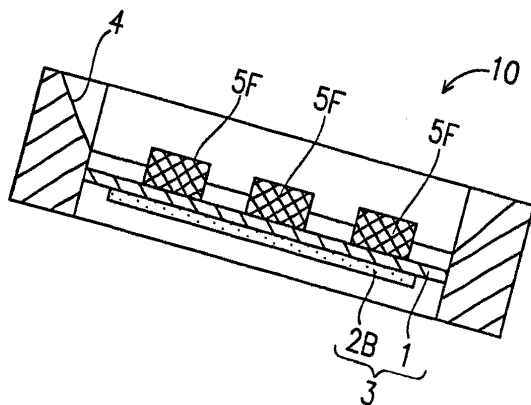


FIG. 16

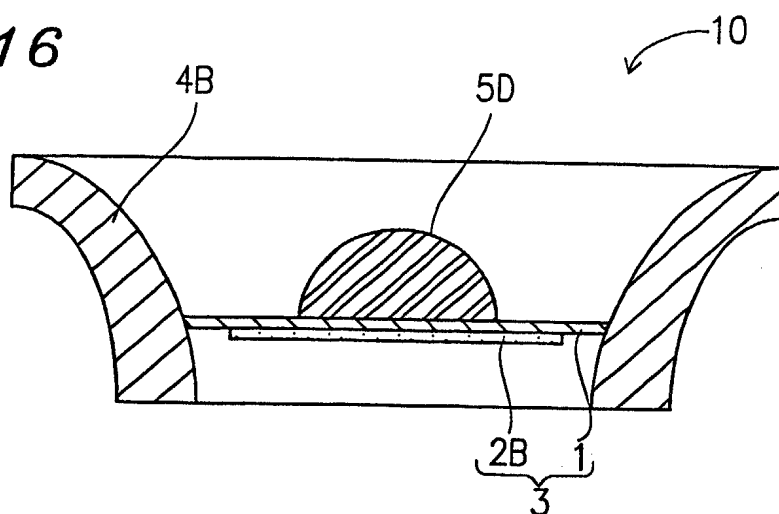


FIG. 17

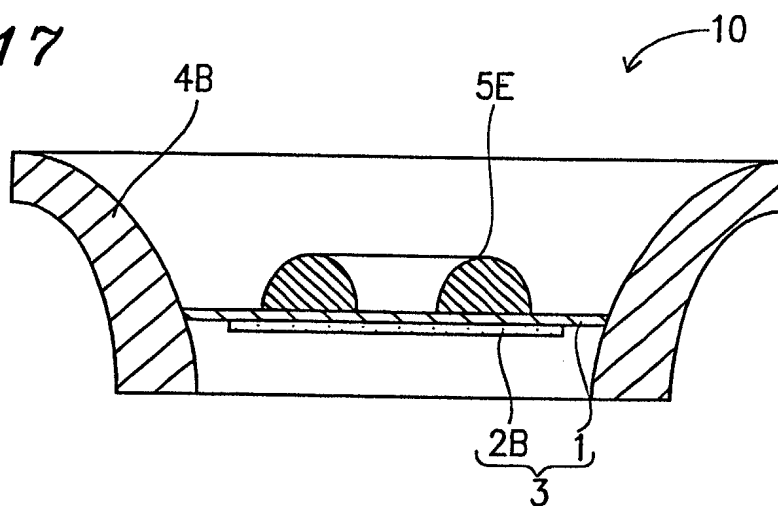


FIG. 18

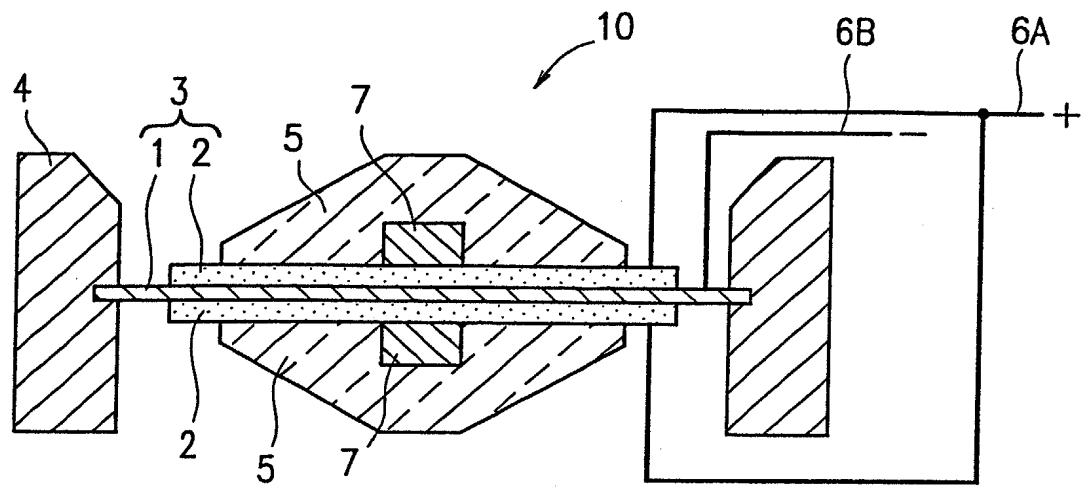


FIG. 19A

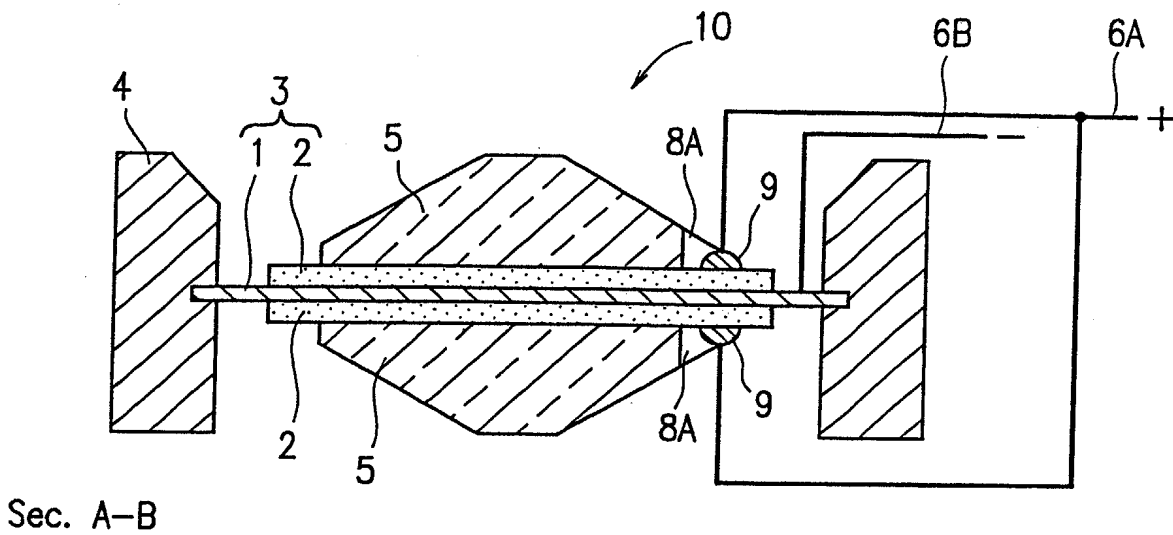


FIG. 19B

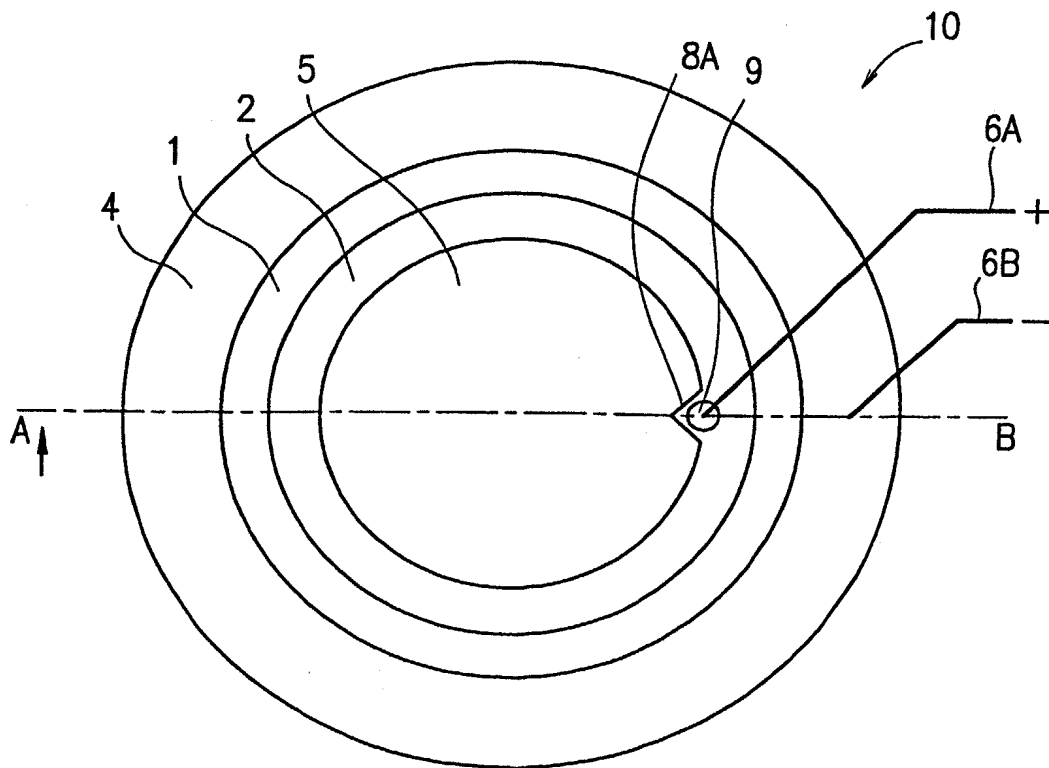


FIG. 20

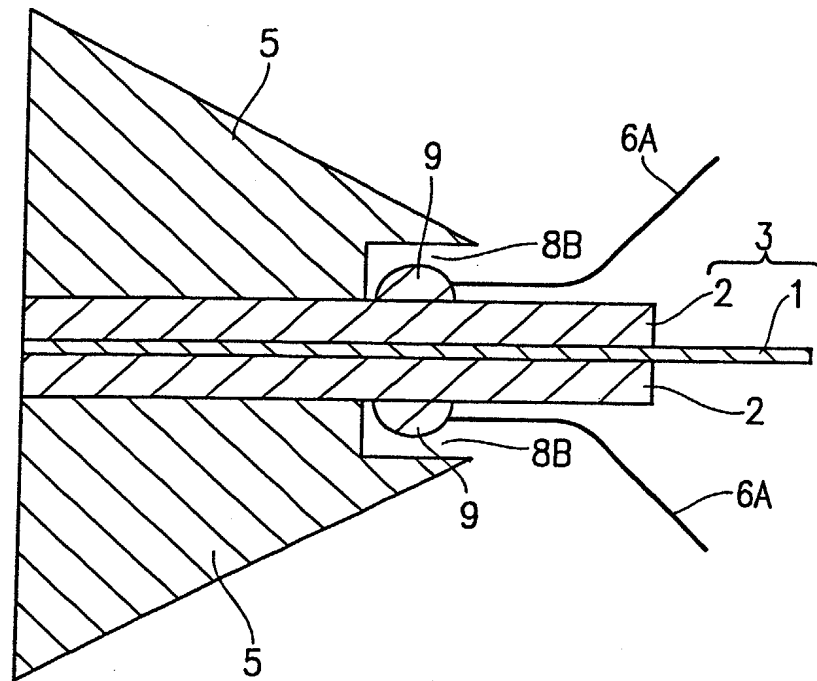


FIG. 21

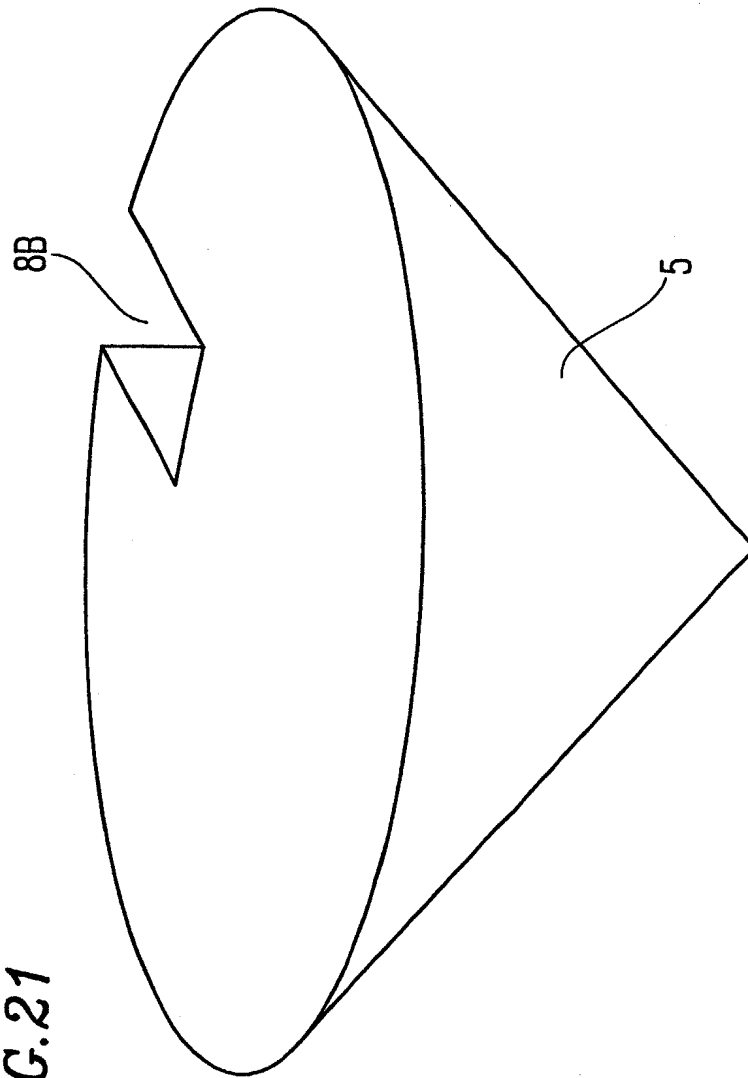


FIG. 22

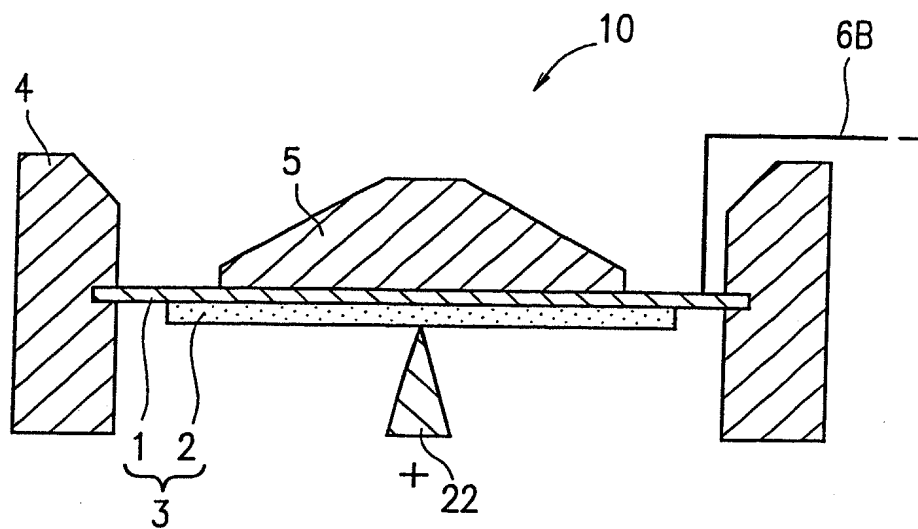


FIG. 23

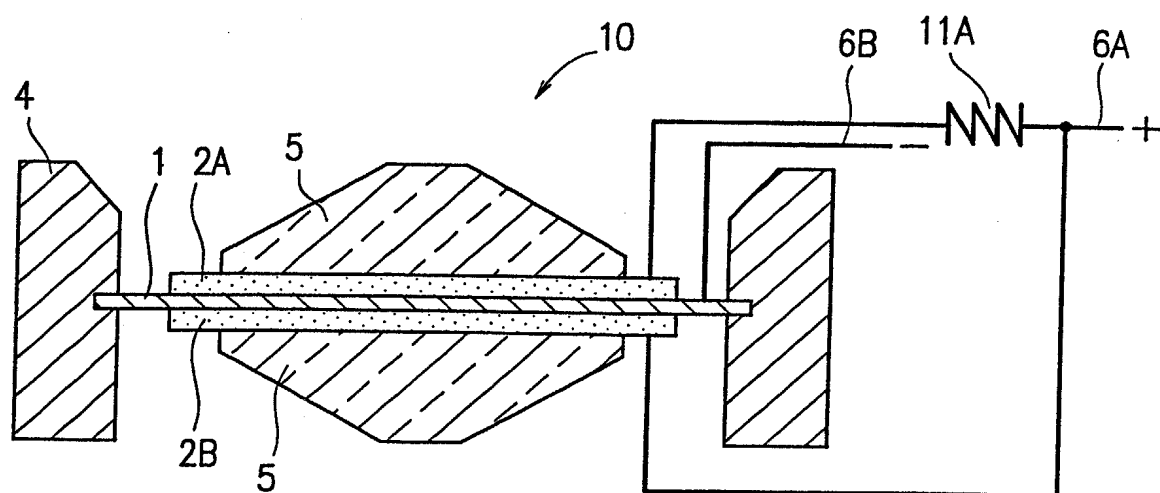


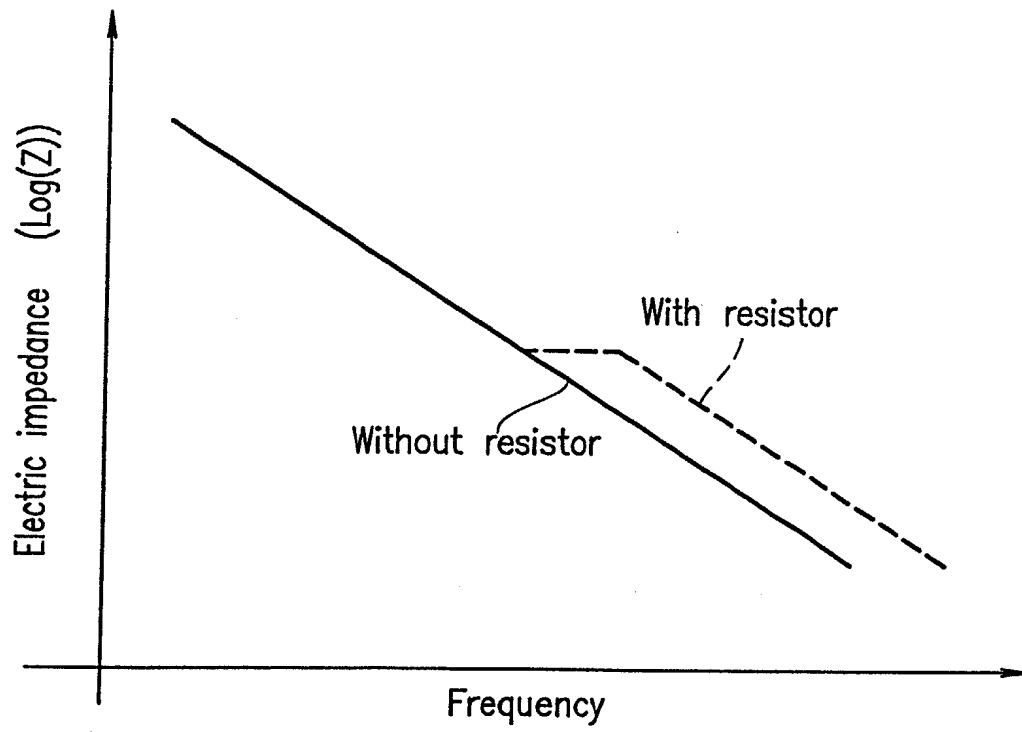
FIG. 24

FIG. 25

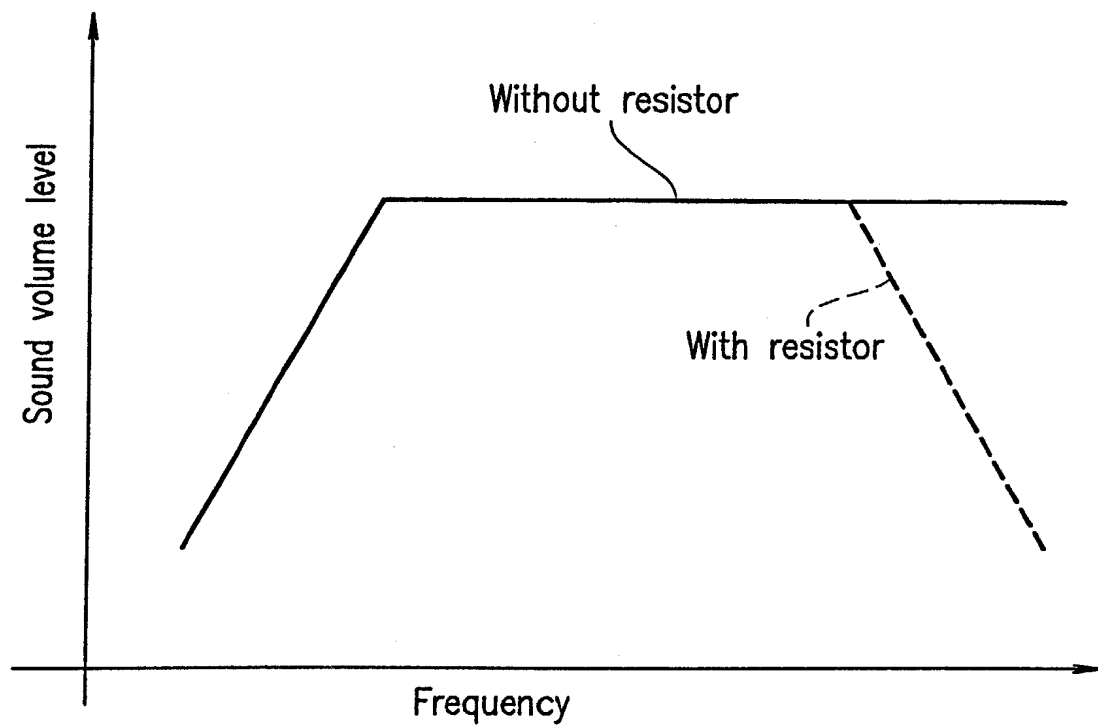


FIG. 26

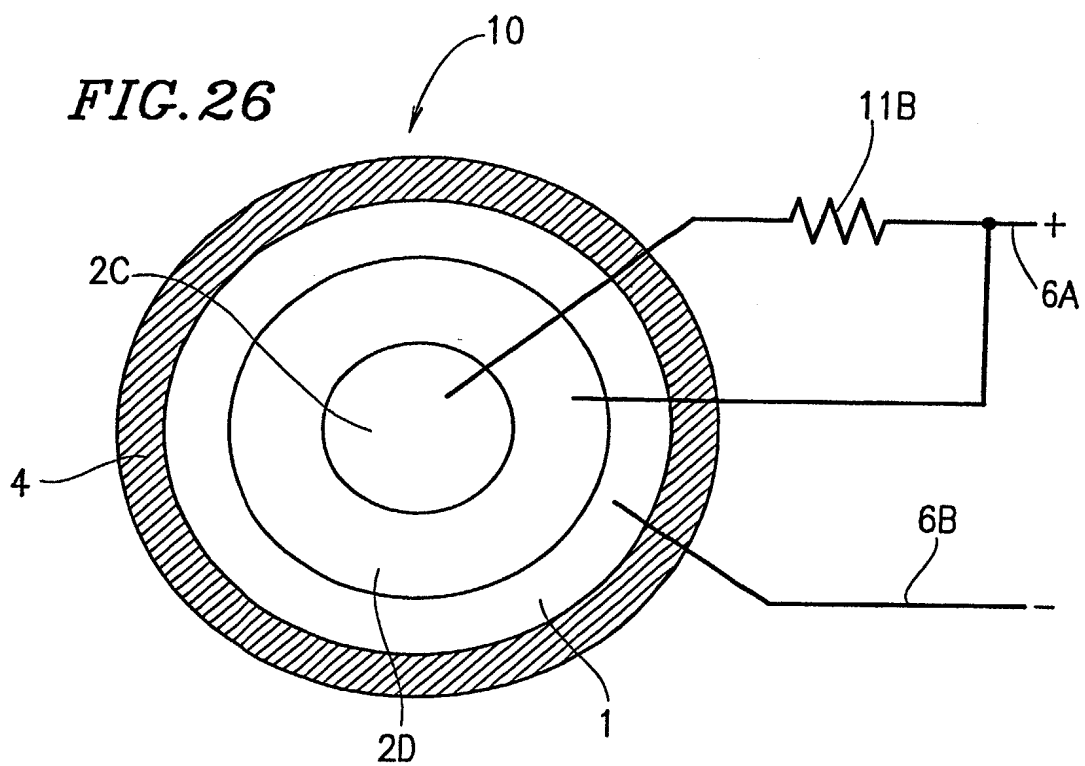
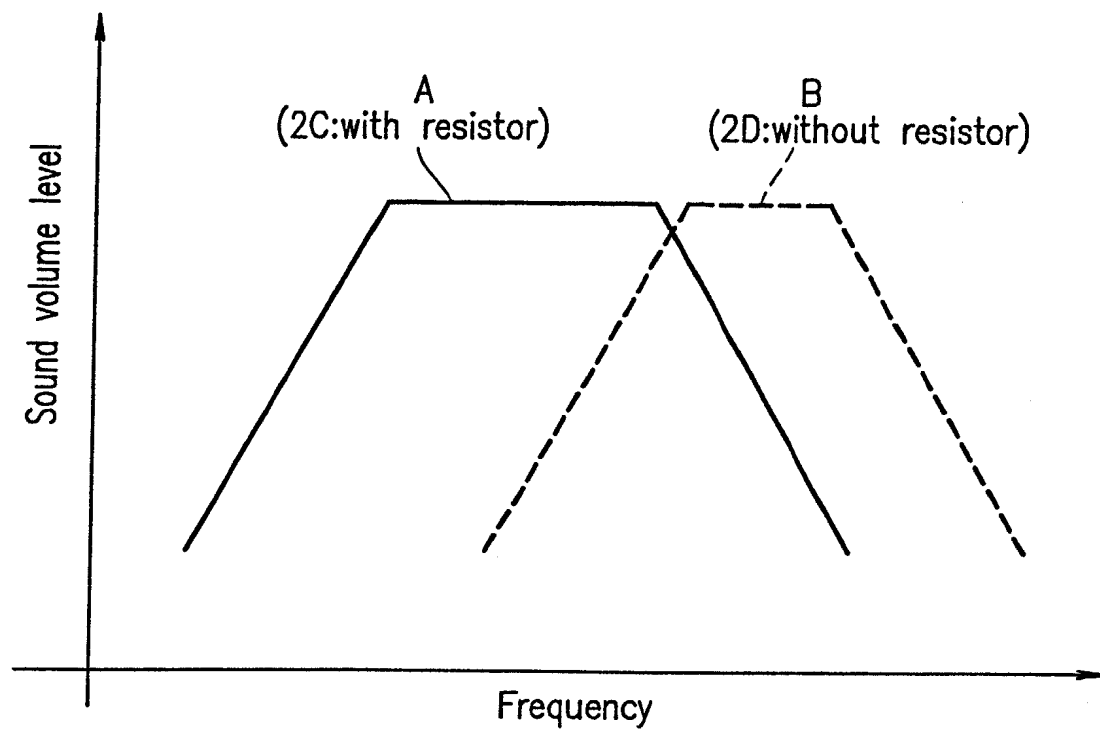


FIG. 27

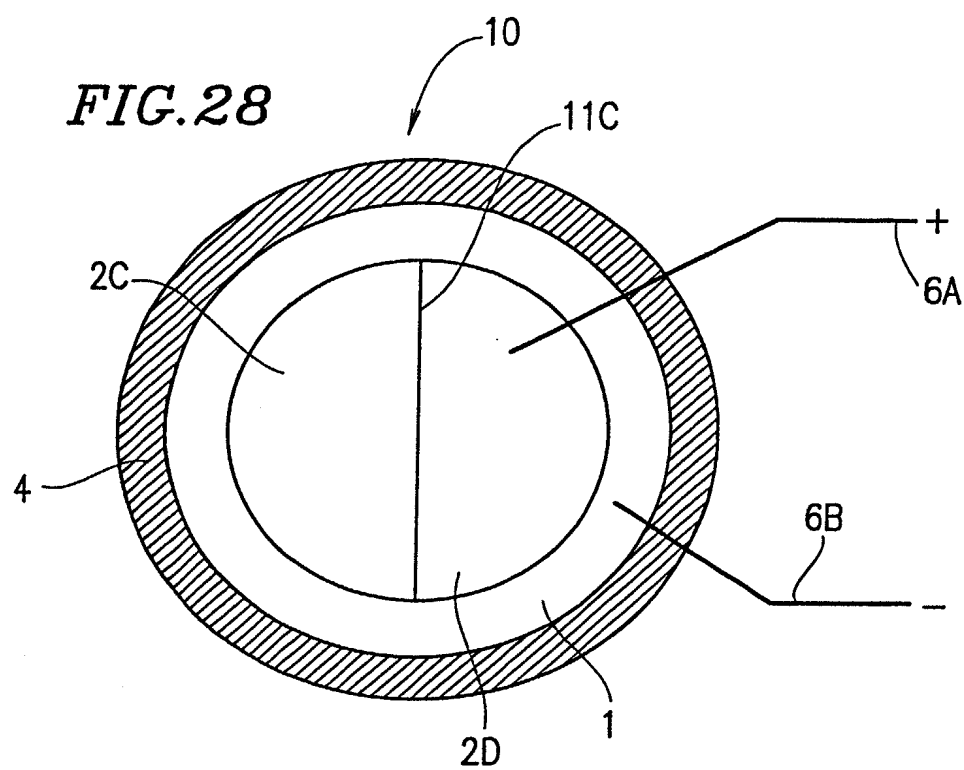
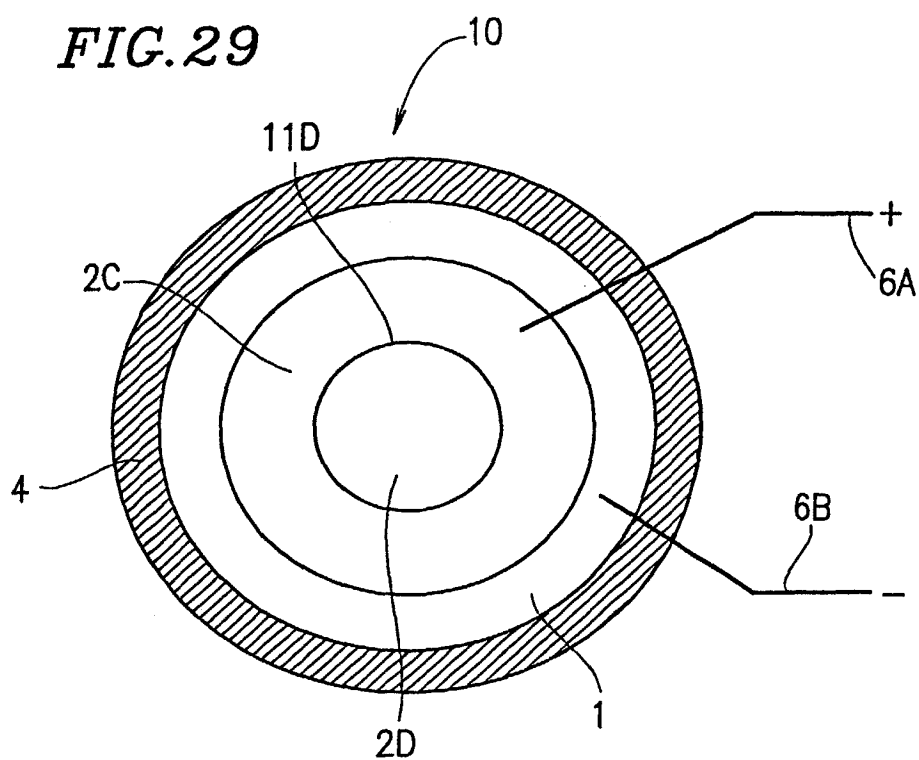


FIG. 29



667077 P02E460

FIG. 30

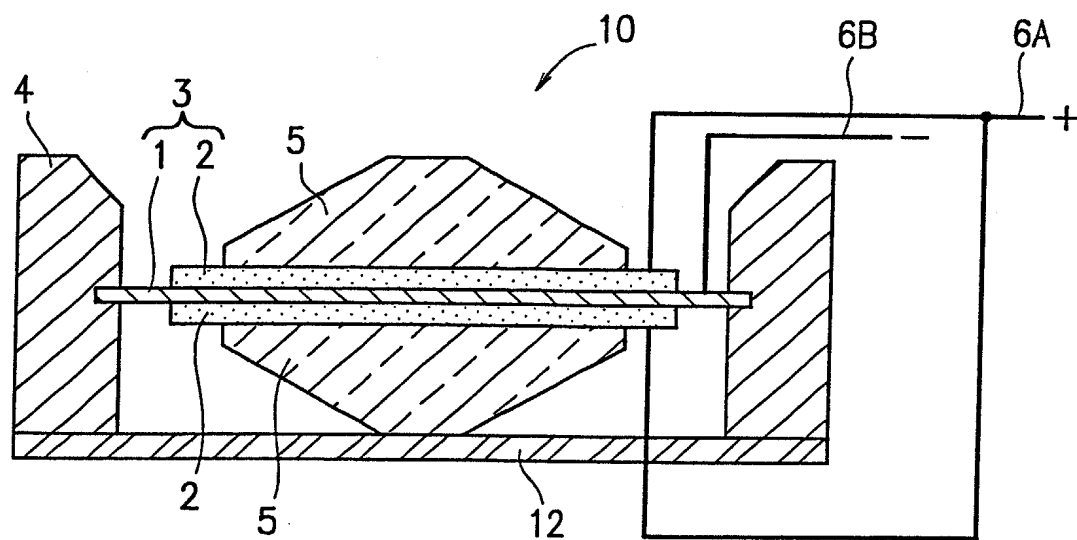


FIG. 31

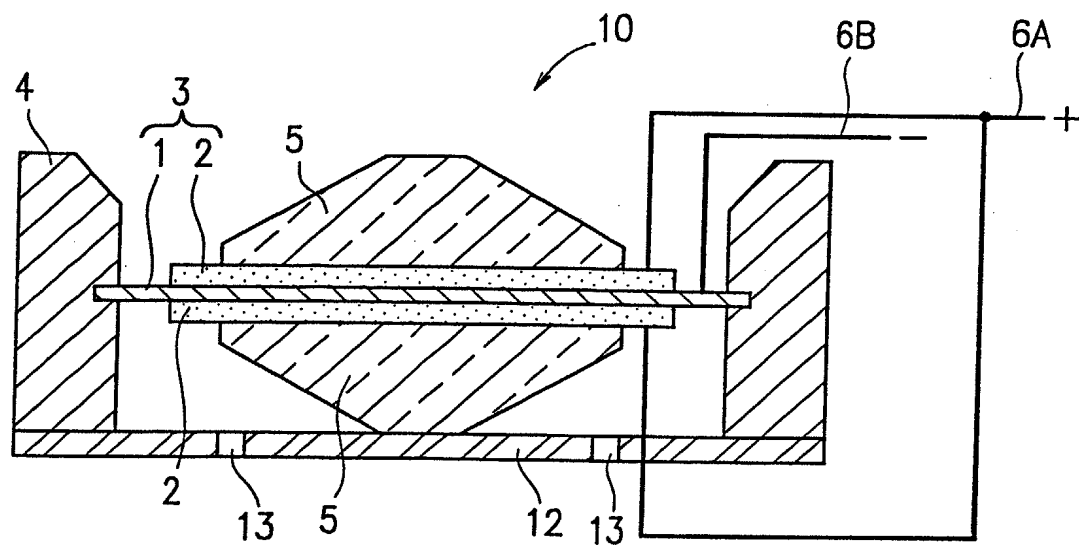


FIG. 32

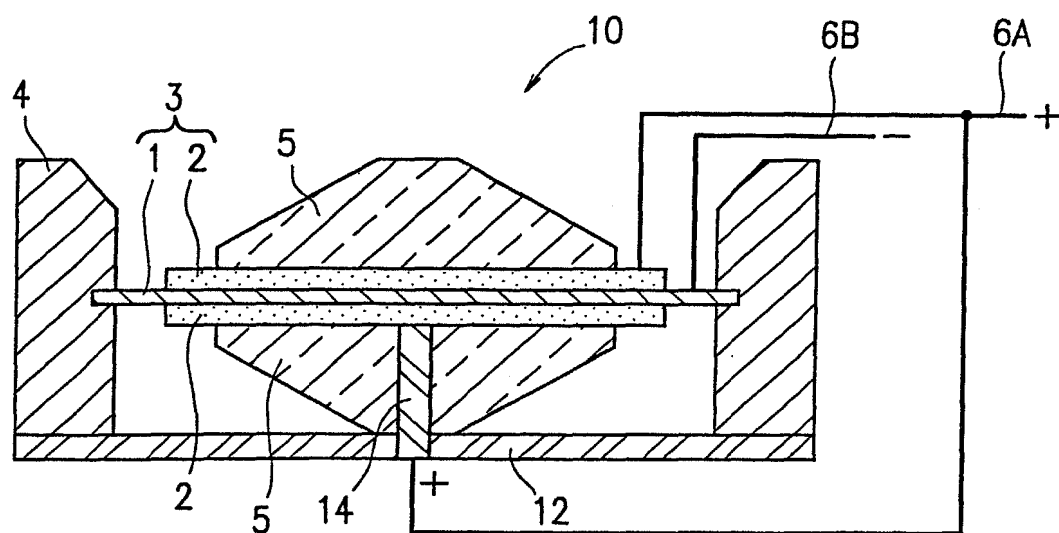


FIG. 34A

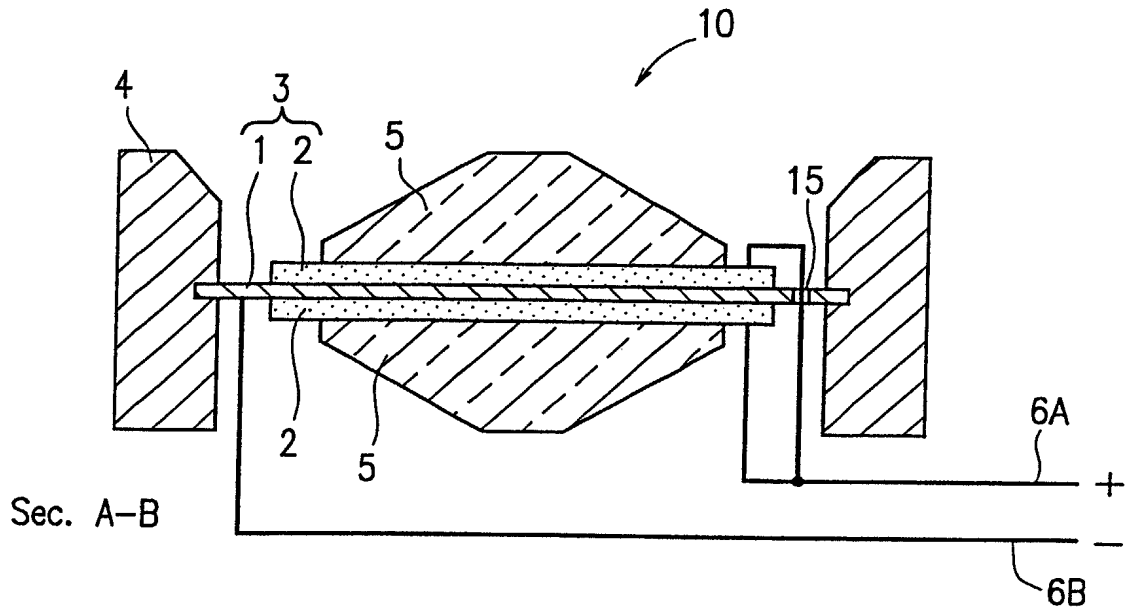


FIG. 34B

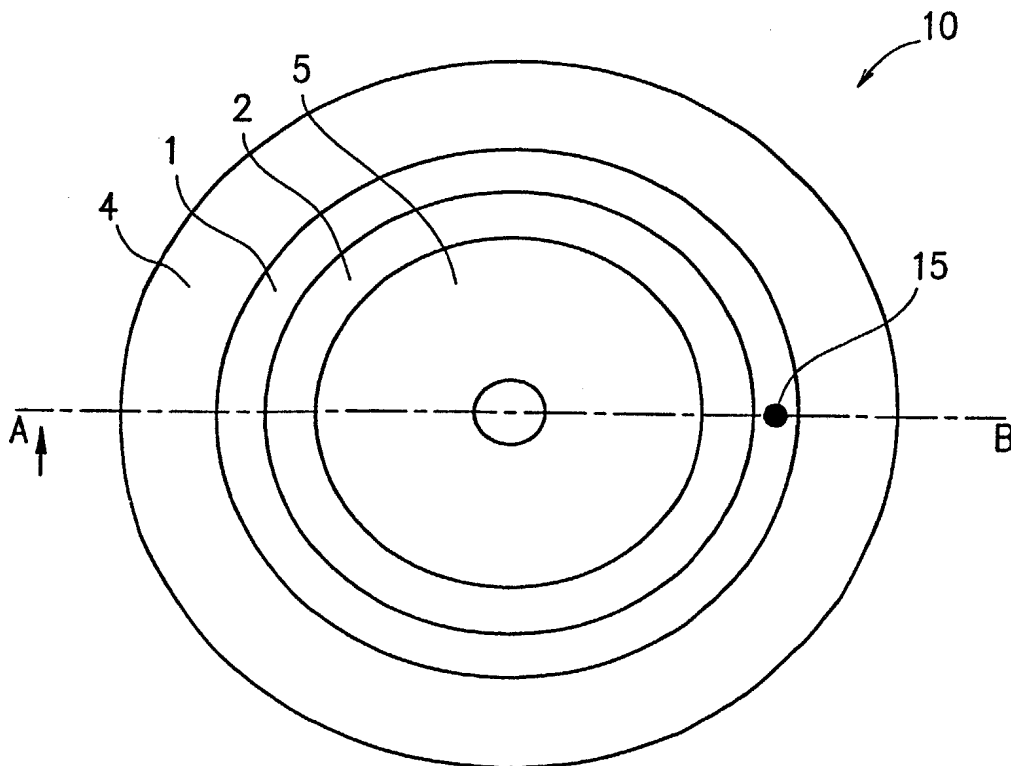


FIG. 35A

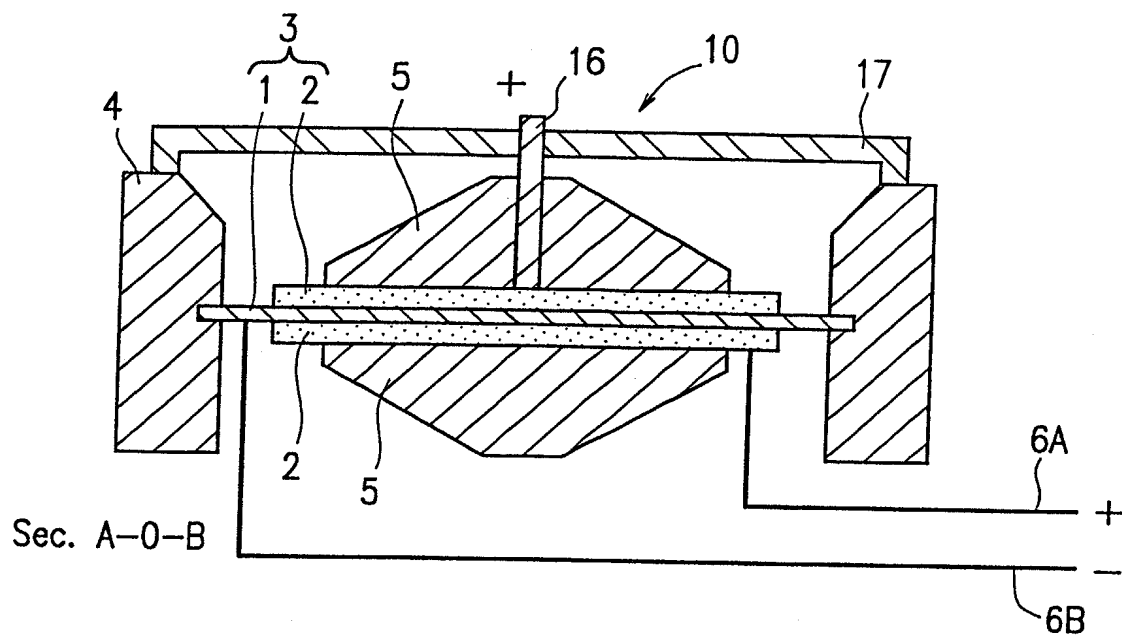


FIG. 35B

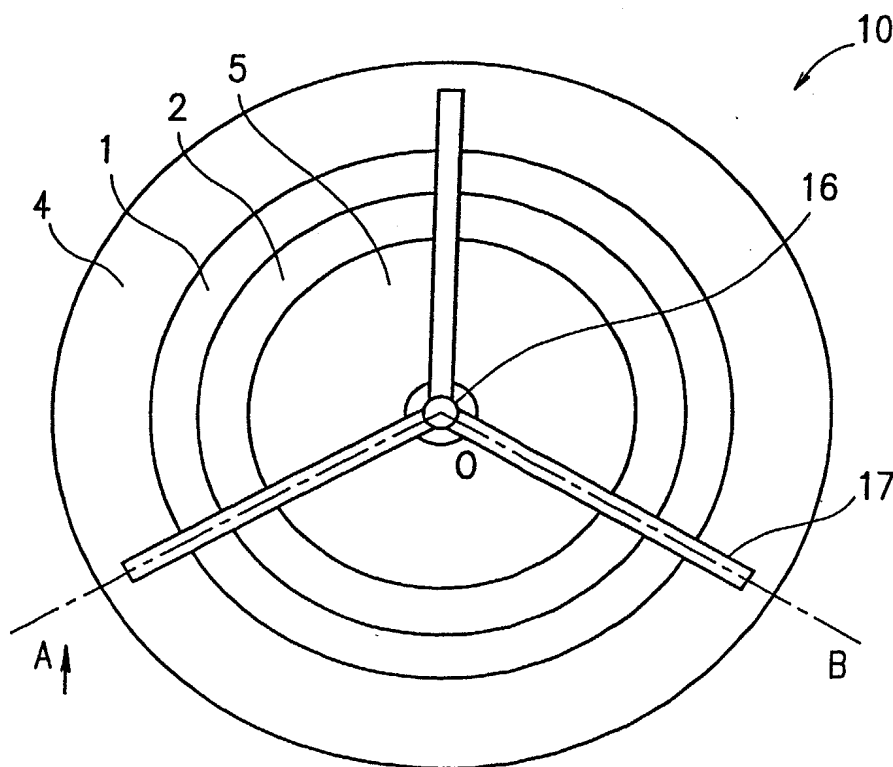


FIG. 36A

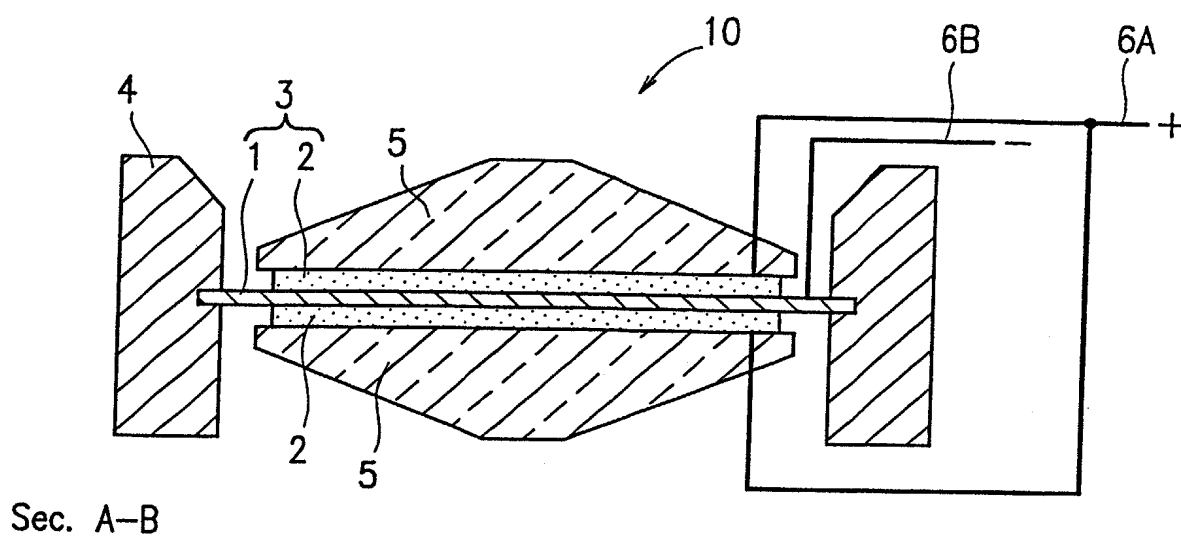


FIG. 36B

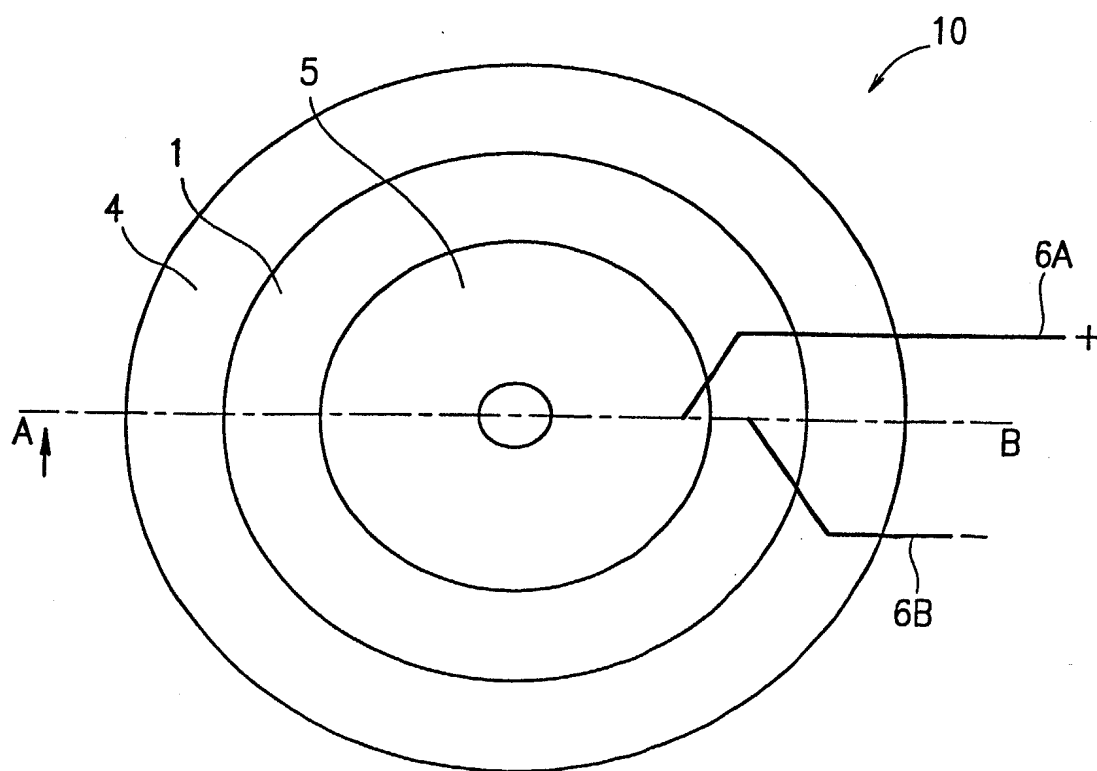


FIG. 37

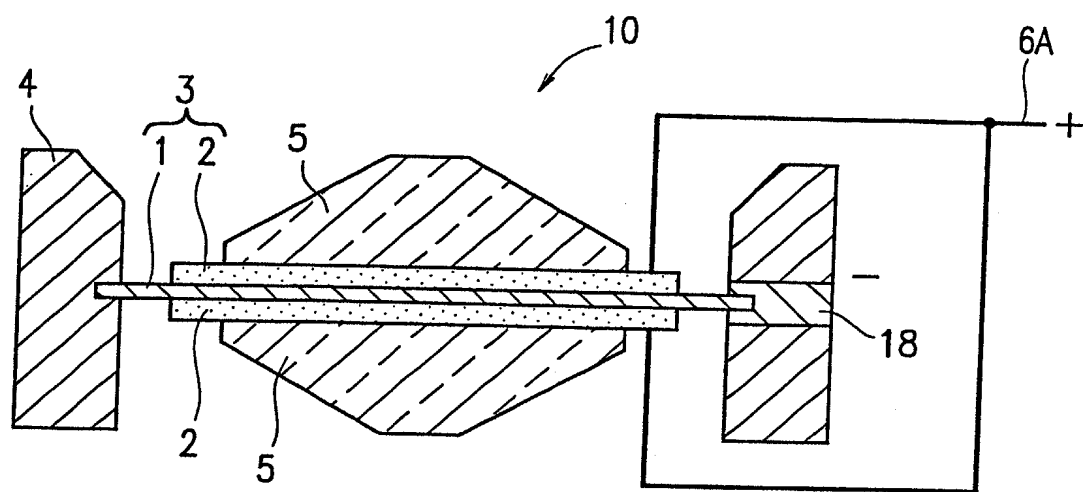


FIG. 38

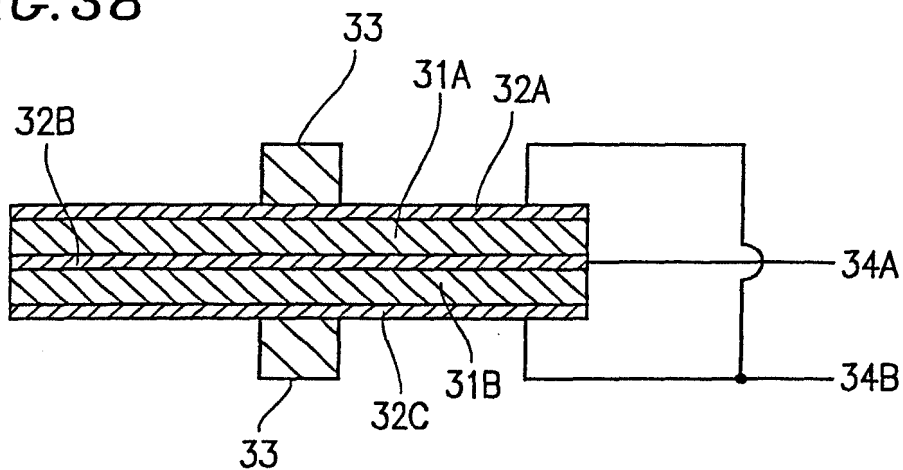


FIG. 39

